

ATTACHMENT 20

Page 1

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

CISCO SYSTEMS, INC.,)
)
Plaintiff,)
) Case No.
vs.) 5:14-cv-05344-BLF (PSG)
)
ARISTA NETWORKS, INC.,)
)
Defendant.)
_____)

HIGHLY CONFIDENTIAL - ATTORNEYS' EYES ONLY

VIDEOTAPED DEPOSITION OF KIRK LOUGHEED
Palo Alto, California
Friday, November 20, 2015
Volume I

Reported by:
CARLA SOARES
CSR No. 5908
Job No. 2187110
Pages 1 - 189

Page 3

APPEARANCES:

For the Plaintiff and the Witness:

QUINN EMANUEL URQUHART & SULLIVAN, LLP
BY: JOHN (JAY) NEUKOM, Attorney at Law
50 California Street, 22nd Floor
San Francisco, California 94111
415.875.6341
johnneukom@quinnemanuel.com
and
KIRKLAND & ELLIS LLP
BY: JOSHUA L. SIMMONS, Attorney at Law
601 Lexington Avenue
New York, New York 10022
212-446-4989
joshua.simmons@kirkland.com

Page 2

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

CISCO SYSTEMS, INC.,)
)
Plaintiff,)
) Case No.
vs.) 5:14-cv-05344-BLF (PSG)
)
ARISTA NETWORKS, INC.,)
)
Defendant.)
_____)

VIDEOTAPED DEPOSITION OF KIRK LOUGHEED,
Volume I, taken on behalf of Defendant, at
650 Page Mill Road, Palo Alto, California, beginning
at 9:19 a.m., and ending at 6:15 p.m., on Friday,
November 20, 2015, before CARLA SOARES, Certified
Shorthand Reporter No. 5908.

Page 4

APPEARANCES (Continued):

For the Defendant:

KEKER & VAN NEST LLP
BY: BRIAN L. FERRALL, Attorney at Law
BY: RYAN WONG, Attorney at Law
633 Battery Street
San Francisco, California 94111
415.391.5400
bferrall@kvn.com
rwong@kvn.com

ALSO PRESENT: Sean Grant, Video Operator
--o0o--

Page 53

1 A That's correct. 11:06:23
 2 Q Would there be any way to know whether you
 3 were logged in or not?
 4 A Yes.
 5 Q What was that? 11:06:35
 6 A There was a command "information about
 7 job" that would tell you.
 8 Q What was that command?
 9 A "Information about job."
 10 Q Oh, that was the name of the command? 11:06:56
 11 A Yes.
 12 Q Okay. Did you ever refer to there being
 13 different modes in TOPS-20?
 14 A Could you clarify what you mean by "mode"?
 15 Q Well, I guess, first let me ask you just 11:07:40
 16 if you ever used that term. Did you ever use the
 17 term "modes" in referring to TOPS-20 functionality?
 18 A There were many programs that ran on
 19 TOPS-20 that had a concept of mode.
 20 Q Can you give me an example? 11:08:09
 21 A There was an editor that -- there was a
 22 program called EMax for editing that had different
 23 modes depending on what programming language you
 24 were editing.
 25 Q Do you know if EXEC included a parser? 11:09:17

Page 54

1 A Could you explain to me what you mean by 11:09:26
 2 "parser"?
 3 Q Do you know what a parser is?
 4 A I know in a generic sense what a parser
 5 is. 11:09:45
 6 Q What's a parser in your -- based on your
 7 understanding?
 8 A A parser is something that takes a string
 9 of text and divides it up into a sequence of tokens,
 10 and then takes some action based on those sequence 11:10:09
 11 of tokens.
 12 Q Based upon that understanding, do you know
 13 whether EXEC had a parser?
 14 A Yes.
 15 Q It did? 11:10:25
 16 A It did.
 17 Q How do you know that it had a parser?
 18 A Because it had the behavior that I
 19 described.
 20 Q Had you ever seen the EXEC source code? 11:11:03
 21 A Yes.
 22 Q And had you seen the parser code of EXEC?
 23 A I had seen parts of it.
 24 Q How did you come to see that code?
 25 A It was -- Stanford had a source license to 11:11:33

Page 55

1 that software. 11:11:38
 2 [REDACTED]
 3 [REDACTED]
 4 [REDACTED]
 5 [REDACTED]
 6 [REDACTED]
 7 [REDACTED]
 8 [REDACTED]
 9 [REDACTED]
 10 [REDACTED]
 11 [REDACTED]
 12 [REDACTED]
 13 [REDACTED]
 14 [REDACTED]
 15 [REDACTED]
 16 [REDACTED]
 17 [REDACTED]
 18 [REDACTED]
 19 [REDACTED]
 20 [REDACTED]
 21 [REDACTED]
 22 [REDACTED]
 23 [REDACTED]
 24 [REDACTED]
 25 [REDACTED] 11:14:49

Page 56

1 [REDACTED]
 2 [REDACTED]
 3 [REDACTED]
 4 [REDACTED]
 5 [REDACTED]
 6 [REDACTED]
 7 [REDACTED]
 8 [REDACTED]
 9 [REDACTED]
 10 [REDACTED]
 11 [REDACTED]
 12 [REDACTED]
 13 [REDACTED]
 14 [REDACTED]
 15 [REDACTED]
 16 [REDACTED]
 17 [REDACTED]
 18 [REDACTED]
 19 Q Are you familiar with the syntax of
 20 TOPS-20 commands? 11:17:00
 21 A In a -- yes.
 22 Q Can you explain what it is?
 23 A There are many commands. I do not
 24 remember all of them.
 25 Q Was there a general format for TOPS-20 11:17:37

Page 61	Page 63
<p>1 A Correct. 11:28:56</p> <p>2 Q What was that software that Mr. Yeager</p> <p>3 gave to you?</p> <p>4 A It was software that had router</p> <p>5 functionality as well as terminal server 11:29:22</p> <p>6 functionality.</p> <p>7 Q What had that software been developed for,</p> <p>8 to your knowledge?</p> <p>9 A I believe it was developed to build --</p> <p>10 help construct, build larger Ethernet networks. 11:30:11</p> <p>11 Q Do you know why Mr. Yeager gave you a copy</p> <p>12 of that?</p> <p>13 A There was a -- no. I wasn't in his -- I</p> <p>14 wasn't in his head. I don't know why he decided to</p> <p>15 give me a copy. 11:30:57</p> <p>16 Q Tell me how that came about. I mean, did</p> <p>17 he just come in and give you some software out of</p> <p>18 the blue?</p> <p>19 A My memory is not precise, but I believe I</p> <p>20 sent him some email asking if I could get a copy of 11:31:20</p> <p>21 the software.</p> <p>22 Q And why did you do that?</p> <p>23 A I was interested in making changes to that</p> <p>24 software.</p> <p>25 Q What had been your exposure to that 11:31:45</p>	<p>1 Q And would this software -- let's say the 11:33:54</p> <p>2 terminal server part of it at least, was that</p> <p>3 running on the -- for example, the DECSYSTEM-20</p> <p>4 computers?</p> <p>5 A No. 11:34:09</p> <p>6 Q What was it running on?</p> <p>7 A It was running on a SUN processor card</p> <p>8 where -- well, a SUN processor card.</p> <p>9 Q The SUN processor card was not a -- itself</p> <p>10 a Sun computer, known as a Sun computer yet? 11:34:52</p> <p>11 A It was not known -- it was -- could you</p> <p>12 rephrase the question?</p> <p>13 Q Sure.</p> <p>14 Well, SUN -- SUN is -- you're referring to</p> <p>15 Sun Microsystems? 11:35:14</p> <p>16 A No.</p> <p>17 Q What does -- what's the SUN processor card</p> <p>18 then?</p> <p>19 A Stanford University network.</p> <p>20 Q Okay. And did that -- do you understand 11:35:24</p> <p>21 that that SUN became the Sun of Sun Microsystems?</p> <p>22 A That is my understanding.</p> <p>23 Q Had Sun Microsystems come into existence</p> <p>24 at this time?</p> <p>25 A I don't recall the dates. 11:35:53</p>
Page 62	Page 64
<p>1 software prior to receiving a copy of it from 11:31:52</p> <p>2 Mr. Yeager?</p> <p>3 A The software that I was interested in was</p> <p>4 the terminal server software, which...</p> <p>5 Q And why did you know about it? 11:32:18</p> <p>6 A Stanford had a number of terminal servers</p> <p>7 on its network, and we used them.</p> <p>8 Q Can you tell me what you -- what is a</p> <p>9 terminal server?</p> <p>10 A It is a device for concentrating character 11:32:47</p> <p>11 mode terminals onto a network, and using a network</p> <p>12 protocol to exchange characters back and forth</p> <p>13 between the terminal server and the networked</p> <p>14 computer at the other end.</p> <p>15 Q Did the software that Mr. Yeager provided 11:33:17</p> <p>16 to you, did it have a name at the time?</p> <p>17 A Not that I recall.</p> <p>18 Q And was that software actually in use at</p> <p>19 the time that you received a copy of it?</p> <p>20 A That was my understanding. 11:33:40</p> <p>21 Q That it was in use?</p> <p>22 A Yes.</p> <p>23 Q Where was it in use?</p> <p>24 A In terminal servers on the Stanford</p> <p>25 network. 11:33:51</p>	<p>1 Q Okay. So you weren't responsible for the 11:35:54</p> <p>2 terminal server software as part of your duties at</p> <p>3 Stanford, were you?</p> <p>4 A I was not responsible for the terminal</p> <p>5 server software as part of my official duties. 11:36:27</p> <p>6 Q Okay. So you requested the software from</p> <p>7 Mr. Yeager out of interest; is that fair?</p> <p>8 A Yes.</p> <p>9 Q And do you know approximately when you</p> <p>10 made that request to Mr. Yeager for the software? 11:36:44</p> <p>11 A To the best of my recollection, it was</p> <p>12 early 1985. It could have been late 1984, though.</p> <p>13 Q Do you know who wrote the software that</p> <p>14 Mr. Yeager provided to you?</p> <p>15 A I do not know -- I do not know who wrote 11:37:43</p> <p>16 the software.</p> <p>17 Q Do you know anyone who contributed to that</p> <p>18 software?</p> <p>19 A I believe Mr. Yeager was one of the people</p> <p>20 that contributed to that software. 11:37:58</p> <p>21 Q Do you know anyone else who contributed to</p> <p>22 it?</p> <p>23 A Not with any certainty.</p> <p>24 Q Who is Benji Levy?</p> <p>25 A He was an undergraduate at Stanford. 11:38:29</p>

Page 65	Page 67
<p>1 Q While you were there? 11:38:34</p> <p>2 A Yes.</p> <p>3 Q Did you ever work with Mr. Levy?</p> <p>4 A Yes.</p> <p>5 Q In what capacity? 11:38:48</p> <p>6 A I hired him.</p> <p>7 Q At Cisco?</p> <p>8 A Yes. At Stanford.</p> <p>9 Q Oh. In what role did you hire him? Or</p> <p>10 what position did you hire him for, to be clear? 11:39:26</p> <p>11 A We referred to it as a cable -- a cable</p> <p>12 troll. Hardware technician would probably be the</p> <p>13 more modern description of that.</p> <p>14 Q Did he work at all on modifying the</p> <p>15 software that Mr. Yeager provided to you? 11:40:21</p> <p>16 A Not to my direct knowledge. Software was</p> <p>17 not part of his job duties for me.</p> <p>18 Q And to be clear, did Mr. Almqvist work on</p> <p>19 modifying any of that software that Mr. Yeager</p> <p>20 provided to you? 11:40:55</p> <p>21 A He may have.</p> <p>22 Q To your knowledge, did he?</p> <p>23 A I have no direct knowledge of that.</p> <p>24 Q Were you asked to make any changes to the</p> <p>25 software that Mr. Yeager provided to you? 11:41:13</p>	<p>1 Stanford? 11:44:15</p> <p>2 A I don't remember if I provided the source</p> <p>3 back. I certainly provided copies of the improved</p> <p>4 software.</p> <p>5 Q You mean perhaps in binary form? 11:44:34</p> <p>6 A In binary form.</p> <p>7 Q Why didn't you -- sorry. Strike that.</p> <p>8 The software you received from Mr. Yeager</p> <p>9 was in source?</p> <p>10 A Correct. 11:44:44</p> <p>11 Q Why didn't you provide the source back to</p> <p>12 Stanford?</p> <p>13 MR. NEUKOM: Objection. Misstates prior</p> <p>14 testimony.</p> <p>15 THE WITNESS: I don't recall if I provided 11:45:02</p> <p>16 the source code back to anybody at Stanford. I was</p> <p>17 Stanford.</p> <p>18 BY MR. FERRALL:</p> <p>19 Q Did you implement the improved terminal</p> <p>20 server software at Stanford? 11:45:22</p> <p>21 A Yes.</p> <p>22 Q So where did the source for that improved</p> <p>23 terminal server software reside when you implemented</p> <p>24 it?</p> <p>25 A On a UNIX system that was -- that belonged 11:45:46</p>
Page 66	Page 68
<p>1 A No. That was not part of my duties. 11:41:16</p> <p>2 Q Did you talk to anyone about what you were</p> <p>3 going to do with that software before doing it?</p> <p>4 A I may have.</p> <p>5 Q Who did you talk to? 11:41:38</p> <p>6 A I don't remember if I talked to anybody</p> <p>7 before I started on that.</p> <p>8 Q And what prompted you to start modifying</p> <p>9 or changing that software?</p> <p>10 A I wanted to learn a new technology, and I 11:42:39</p> <p>11 wanted to see if I could improve the behavior of the</p> <p>12 terminal server.</p> <p>13 Q What was your intention of what you would</p> <p>14 do with the -- with your modifications to the</p> <p>15 software? 11:43:04</p> <p>16 A That I would be able to improve its</p> <p>17 performance and its manageability.</p> <p>18 Q Sticking with the terminal server</p> <p>19 functionality, did you improve its performance?</p> <p>20 A Yes, I did. 11:43:44</p> <p>21 Q And did you provide your modifications</p> <p>22 back to Mr. Yeager?</p> <p>23 A I don't recall if I -- I don't recall if I</p> <p>24 did or not.</p> <p>25 Q Did you provide those to anyone at 11:44:13</p>	<p>1 to Stanford. 11:45:55</p> <p>2 Q And that's what you had done your</p> <p>3 modifications on?</p> <p>4 A Yep.</p> <p>5 Q Did you make any modifications to the 11:46:12</p> <p>6 router functionality of the Yeager software?</p> <p>7 A My initial interest was only in the --</p> <p>8 only in the terminal server software.</p> <p>9 Q So is that -- I'm sorry. Is that a no,</p> <p>10 you didn't make any modifications to the router 11:46:43</p> <p>11 functionality?</p> <p>12 A I removed it.</p> <p>13 Q You removed it from your copy or -- what</p> <p>14 do you mean, you removed it?</p> <p>15 A That is correct. I removed it from my 11:46:58</p> <p>16 copy.</p> <p>17 Q So again, going back to your testimony</p> <p>18 earlier this morning, when you referred to extending</p> <p>19 and making improvements on software you received</p> <p>20 from Mr. Yeager, was that only as to the terminal 11:47:49</p> <p>21 server functionality?</p> <p>22 A That was my initial intent.</p> <p>23 Q Okay. My question was asking about what</p> <p>24 you did as opposed to your intent.</p> <p>25 Did you only extend and/or make 11:48:13</p>

Page 69			Page 71		
1	improvements to the terminal server part of the	11:48:18	1	A No.	11:54:43
2	software Mr. Yeager provided you?		2	Q Why did you do it?	
3	MR. NEUKOM: Objection to form. Vague,		3	A I had figured out terminal servers and	
4	compound.		4	PUP. The Internet protocol was the -- was the new	
5	THE WITNESS: At a later date I did write	11:48:39	5	developing technology, and I wanted to learn more	11:55:07
6	router support and put it into the software.		6	about how IP worked.	
7	BY MR. FERRALL:		7	Q What resources did you look at to learn	
8	Q Okay. First, what's router support?		8	about how IP worked?	
9	A Being able to receive a packet on one		9	A I looked at RFCs.	
10	interface and figure out which of -- which other	11:49:28	10	Q Anything else?	11:55:46
11	interface to send it out upon, rewriting the header		11	A Not that I -- not that I recall.	
12	of the packet as appropriate.		12	Q At some point did you tell anyone else at	
13	Q What was the -- strike that.		13	Stanford that you were writing this IP support?	
14	Was there router support functionality in		14	A I told my boss, Steve Hanson, and I also	
15	the software Mr. Yeager provided you?	11:50:00	15	discussed it with Len Bosack.	11:56:28
16	A Yes.		16	Q Tell me about your discussion with	
17	Q And what did you do to change that?		17	Mr. Hanson. What did you say to him?	
18	A I removed his support because I wasn't		18	A "This is what I'm doing in my spare time."	
19	interested in it at the time, and later on -- later		19	Q And what did he say?	
20	on my interest changed.	11:50:45	20	A "Fine."	11:56:54
21	Q Okay. I understand that.		21	Q And what did you tell Mr. Bosack?	
22	So what happened later on when your		22	A That I was -- I don't remember the details	
23	interest -- your interest then moved to the router		23	of what I told him. We had technical discussions.	
24	functionality? What did you do?		24	Q What were the technical discussions about?	
25	A I wrote support for IP, and I took a few	11:51:10	25	A How elements of the protocol suite worked,	11:57:42
Page 70			Page 72		
1	pieces of the PUP support that Mr. Yeager had there.	11:51:28	1	programming techniques, possibly where the stuff	11:57:53
2	Well, actually, the PUP support actually		2	could be -- what stuff would be useful to Stanford	
3	already existed for the terminal server portion.		3	that would also be interesting for me.	
4	Q So the terminal server portion already had		4	Q At what time did you first have the idea	
5	PUP support for routing?	11:52:08	5	to use this software in your own commercial venture?	11:58:34
6	A For routing and for terminal sessions.		6	MR. NEUKOM: Objection to form.	
7	Q Okay. And did the software from		7	THE WITNESS: I did not come up with that	
8	Mr. Yeager have any routing support for IP?		8	idea.	
9	A Yes.		9	BY MR. FERRALL:	
10	Q And did you use any of that?	11:52:46	10	Q Who did?	11:58:54
11	A No.		11	A I believe it was Len.	
12	Q What did you do with it?		12	Q And when did you first learn of Len	
13	A It was a confusing mess. I threw it out		13	Bosack's idea to use this software that you were	
14	and wrote my own.		14	working on?	
15	Q And when did you write that routing	11:53:03	15	A Sometime in early '86.	11:59:32
16	support for IP?		16	Q Did you ever tell Mr. Hanson about that	
17	A Late '85, I believe.		17	idea to use the software in a commercial venture?	
18	Q You wrote that -- the code -- sorry.		18	A No.	
19	When you wrote that, the code was on this		19	Q Did you tell anyone at Stanford about that	
20	UNIX computer at Stanford; is that right?	11:53:51	20	idea other than Mr. Bosack?	11:59:56
21	A I did my development on a UNIX system at		21	A No.	
22	Stanford.		22	Q Who is Eric Schoen, S-C-H-O-E-N?	
23	Q Did you talk to anyone about your		23	A I don't know.	
24	intentions in writing this IP routing support prior		24	Q Do you know a Frank Gilmurray?	
25	to doing so?	11:54:41	25	A Vaguely.	12:00:25

Page 77	Page 79
<p>1 Q Who do you know there? 12:56:33</p> <p>2 A I know Vic White. I know as in I --</p> <p>3 socially I know Vic White and Ken Harrenstien. I've</p> <p>4 never heard of Zaw-Sing Su. And Elizabeth Feinler I</p> <p>5 only know by reputation. 12:57:02</p> <p>6 Q Were they -- to your knowledge, were they</p> <p>7 all at SRI?</p> <p>8 A I know that Vic, Ken and Elizabeth were.</p> <p>9 I have no idea -- I've never seen the name Zaw-Sing</p> <p>10 Su before today. 12:57:20</p> <p>11 Q What's SRI International?</p> <p>12 A It is a primarily government-funded</p> <p>13 research institute.</p> <p>14 Q Did you ever have any involvement with</p> <p>15 SRI? And when I say "involvement," I mean some 12:57:52</p> <p>16 official --</p> <p>17 A No.</p> <p>18 Q -- relationship.</p> <p>19 A No.</p> <p>20 Q Okay. Let me ask you to look at 12:58:06</p> <p>21 Exhibit 31.</p> <p>22 Do you ever recall reviewing an RFC for an</p> <p>23 address resolution protocol?</p> <p>24 A I'd actually like to read through this.</p> <p>25 Q Well, I'm just asking you the question 12:58:38</p>	<p>1 A They were all on the border gateway 13:00:09</p> <p>2 protocol.</p> <p>3 Q Has Cisco ever had any policies about</p> <p>4 their employees submitting RFCs to the IETF?</p> <p>5 A I'm not aware of any specific policies. 13:01:02</p> <p>6 Q Did the software that you worked on at</p> <p>7 Stanford, the routing and terminal server software</p> <p>8 we talked about, did that include an address</p> <p>9 resolution protocol?</p> <p>10 MR. NEUKOM: Objection to form. Vague. 13:02:09</p> <p>11 BY MR. FERRALL:</p> <p>12 Q I should say an address resolution</p> <p>13 protocol feature.</p> <p>14 MR. NEUKOM: Same objection.</p> <p>15 THE WITNESS: Yes. 13:02:23</p> <p>16 BY MR. FERRALL:</p> <p>17 Q And what were the sources of information</p> <p>18 for you in order to -- well, strike that.</p> <p>19 Did you write software for the address</p> <p>20 resolution protocol feature? 13:02:38</p> <p>21 A Yes.</p> <p>22 Q And what were the sources of information</p> <p>23 that you used to prepare that address resolution</p> <p>24 protocol feature?</p> <p>25 MR. NEUKOM: Objection to form. Vague, 13:02:58</p>
Page 78	Page 80
<p>1 right now. 12:58:39</p> <p>2 Mr. Lougheed, you have to understand,</p> <p>3 we've got a lot to cover today, and I need to --</p> <p>4 A And I'm also under oath, and I want to</p> <p>5 make sure my replies to your answers (sic) are 12:58:47</p> <p>6 correct.</p> <p>7 Q Okay. So I'm asking you -- you can put</p> <p>8 the document down, frankly.</p> <p>9 Do you ever recall reviewing an RFC for an</p> <p>10 address resolution protocol? 12:58:58</p> <p>11 A Yes, I do recall reviewing a document --</p> <p>12 it may have been an RFC -- on address resolution.</p> <p>13 Q Do you know who developed address</p> <p>14 resolution protocols?</p> <p>15 A I don't recall. 12:59:20</p> <p>16 Q Did you contribute to that field?</p> <p>17 A No.</p> <p>18 Q All right. Do you know David Plummer?</p> <p>19 A I have heard the name before but I don't</p> <p>20 know the person. 12:59:31</p> <p>21 Q How many IETF RFCs have you authored in</p> <p>22 whole or in part?</p> <p>23 A Two, maybe three.</p> <p>24 Q What were the subject or subjects of those</p> <p>25 RFCs? 13:00:07</p>	<p>1 calls for a conclusion. 13:03:06</p> <p>2 THE WITNESS: Documents whose name I do</p> <p>3 not recall.</p> <p>4 BY MR. FERRALL:</p> <p>5 Q Can you describe generally what they were? 13:03:16</p> <p>6 A They were documents that described a</p> <p>7 packet format and described an associated state</p> <p>8 machine.</p> <p>9 Q Is the address resolution protocol</p> <p>10 referred to simply by the acronym ARP? 13:03:59</p> <p>11 A There's a general concept of an address</p> <p>12 resolution protocol, and then there's one, possibly</p> <p>13 more, that are -- may be described in various</p> <p>14 documents from the IETF.</p> <p>15 Q When did you first hear -- have you ever 13:04:52</p> <p>16 heard the address resolution protocol abbreviated as</p> <p>17 ARP?</p> <p>18 A Yes.</p> <p>19 Q When did you first hear that abbreviation?</p> <p>20 A I don't recall -- I don't recall the 13:05:17</p> <p>21 precise time.</p> <p>22 Q Was it while you were still at Stanford?</p> <p>23 A It certainly could have been.</p> <p>24 Q Did you develop any features for the</p> <p>25 address resolution protocol yourself? 13:05:52</p>

Page 81	Page 83
<p>1 MR. NEUKOM: Objection. Vague. 13:05:56</p> <p>2 THE WITNESS: I do not understand your</p> <p>3 question. What do you mean, develop features for</p> <p>4 the address resolution protocol?</p> <p>5 BY MR. FERRALL: 13:06:12</p> <p>6 Q Fair enough. Let me ask it a different</p> <p>7 way.</p> <p>8 Did you contribute to any IETF RFC</p> <p>9 relating to the address resolution protocol?</p> <p>10 MR. NEUKOM: Objection. Asked and 13:06:27</p> <p>11 answered.</p> <p>12 THE WITNESS: No.</p> <p>13 BY MR. FERRALL:</p> <p>14 Q Did you develop features at -- while at</p> <p>15 Cisco that relate to ARP, if you don't mind me using 13:06:44</p> <p>16 the acronym?</p> <p>17 A I don't understand the question.</p> <p>18 Q Who is Glenn Truitt?</p> <p>19 A He's a -- at my time at Stanford, he was a</p> <p>20 graduate student. 13:08:37</p> <p>21 Q Did you work with him while at Stanford?</p> <p>22 A Briefly.</p> <p>23 Q In what capacity?</p> <p>24 A I recollect that he may have written a</p> <p>25 user guide to the software at the time, but that's 13:09:21</p>	<p>1 BY MR. FERRALL: 13:11:01</p> <p>2 Q At some point did you or colleagues of</p> <p>3 yours at Stanford refer to a gateway project?</p> <p>4 A There was -- I don't recall anything that</p> <p>5 was a gateway project. 13:11:20</p> <p>6 Q Did you ever refer to your -- the software</p> <p>7 that you were working on, the routing and the</p> <p>8 terminal server software, as software for a gateway?</p> <p>9 MR. NEUKOM: Objection to form.</p> <p>10 THE WITNESS: The devices that the 13:11:50</p> <p>11 software ran on were either terminal servers or</p> <p>12 gateways.</p> <p>13 BY MR. FERRALL:</p> <p>14 Q What does a -- what's a gateway?</p> <p>15 A At Stanford at that time, it was what has 13:12:08</p> <p>16 since been called a router. It's an obsolete name</p> <p>17 for a router.</p> <p>18 Q Do you know who came up with the term</p> <p>19 "gateway"?</p> <p>20 A No, I don't. 13:12:23</p> <p>21 Q When did you first hear the term</p> <p>22 "gateway"?</p> <p>23 A I don't recall.</p> <p>24 Q At Stanford sometime?</p> <p>25 A Yes. 13:12:39</p>
Page 82	Page 84
<p>1 about all that I remember of my interactions with 13:09:29</p> <p>2 him.</p> <p>3 Q Did you oversee his writing of a user</p> <p>4 guide to the software?</p> <p>5 A No. 13:09:52</p> <p>6 Q Who did, do you know?</p> <p>7 A I have no idea.</p> <p>8 Q Why -- to your knowledge, do you know why</p> <p>9 he wrote a user guide to the software?</p> <p>10 MR. NEUKOM: Objection. Foundation. 13:10:07</p> <p>11 THE WITNESS: No, I don't -- I don't</p> <p>12 recall why he was doing that.</p> <p>13 BY MR. FERRALL:</p> <p>14 Q And can you tell me, at what state of</p> <p>15 development of the software did he write a user 13:10:21</p> <p>16 guide for?</p> <p>17 A I don't recall.</p> <p>18 Q At any time before you left Stanford, did</p> <p>19 you have a name for the software that you were</p> <p>20 working on that you had received from Mr. Yeager 13:10:43</p> <p>21 originally?</p> <p>22 MR. NEUKOM: Objection. Misstates prior</p> <p>23 testimony.</p> <p>24 THE WITNESS: There was no formal name for</p> <p>25 the software. 13:10:58</p>	<p>1 Q Were there devices that functioned as 13:12:47</p> <p>2 gateways in operation at Stanford before you left?</p> <p>3 A Yes.</p> <p>4 Q When, to your knowledge, was such a</p> <p>5 gateway device first operational at Stanford? 13:13:09</p> <p>6 A I don't know.</p> <p>7 Q When did you first hear about a functional</p> <p>8 gateway at Stanford?</p> <p>9 A I don't recall.</p> <p>10 Q Before you got the software from 13:13:30</p> <p>11 Mr. Yeager?</p> <p>12 A Quite possibly.</p> <p>13 Q Does the term TIP, T-I-P, mean anything to</p> <p>14 you from your time at Stanford?</p> <p>15 A Yes. 13:13:57</p> <p>16 Q What's that?</p> <p>17 A It's an acronym.</p> <p>18 Q What does it mean?</p> <p>19 A Terminal interface processor.</p> <p>20 Q Did any of your work while you were 13:14:12</p> <p>21 employed at Stanford have to do with a TIP?</p> <p>22 A That was not part of my duties.</p> <p>23 Q My question was a little bit different.</p> <p>24 A Okay.</p> <p>25 Q My question was, while you were employed 13:14:31</p>

Page 93

Page 95

1 Q Since you say that, let me ask you, what 13:37:12
2 was the purpose of this correspondence that's
3 Exhibit 33? Do you recall?

4 A The Cisco marketing people were
5 constructing a timeline for what Cisco was doing 13:37:31
6 starting in 1984, and I was giving them some advice
7 as to what I thought was a more -- more accurate
8 view.

9 Q By the way, you're Cisco employee number
10 four; is that right? 13:38:00

11 A Close enough.

12 Q Who's number three, do you know?

13 A So when we handed out badge numbers, the
14 secretary got badge 1, Sandy got badge 2, Len got
15 badge 3, and I had badge 4. 13:38:27

16 MR. FERRALL: Okay. That explains it.

17 Let's mark this as the next exhibit.

18 (Exhibit 34 was marked for identification
19 and is attached hereto.)

20 BY MR. FERRALL: 13:38:51

21 Q Marked as Exhibit 34 is I guess a two-page
22 set of emails bearing control numbers
23 CSI-CLI-01317865 to 66.

24 My question for you -- and you're welcome
25 to read this one, of course -- is -- I would like 13:39:12

1 those still saved somewhere? 13:42:13

2 A I had a copy in my Cisco directory.

3 Q Do you know, do you still have a copy of
4 those files somewhere?

5 A Yes. 13:42:30

6 Q Where?

7 A I believe they're still on my Cisco

Age Group	Should Take Action (%)	Should Not Take Action (%)
18-29	80	0
30-49	75	0
50-64	70	0
65+	10	90

Page 94

1 you to explain what it is that you attached to this 13:39:19
2 email.

3 A Okay. I've read it.

4 I'm sorry. What was your question again?

5 Q Well, so in the last email in this thread, 13:40:14
6 you write, "Here's the original tarball, gzipped.
7 Kirk."

8 Right?

9 A Right.

10 Q First of all, can you explain what you 13:40:32
11 mean by "tarball"?

12 A There is a UNIX program called TAR, tape
13 archive, that is used to gather a group of files
14 together. It's a way of moving files from one UNIX
15 system to another UNIX system. And a tarball is an 13:40:56
16 informal description of the file that results.

17 Q Okay. So when you said "the original
18 tarball, gzipped," what do you mean by that?

19 A I don't recall what was on my mind to use
20 the adjective "original." 13:41:26

21 Q Do you know what these files were that you
22 attached to this email?

23 A I believe they are files that comprise the
24 software that I was working on at Stanford.

25 Q And I guess as of 2010, at least, you had 13:42:10

[illegible]

Page 97

1

15 MR. FERRALL: I didn't realize that. 13:51:39

16 Thank you for clarifying that.

17 Actually, we can take a quick break.

18 MR. NEUKOM: Okay.

19 THE VIDEO OPERATOR: Going off the record,
20 the time is 1:52 p.m. 13:51:57

21 (Recess, 1:52 p.m. - 2:03 p.m.)

22 THE VIDEO OPERATOR: Back on the record.

23 The time is 2:03 p.m.

24 MR. FERRALL: Let's mark this as the next
25 exhibit. 14:03:07

Page 100

1 (Exhibit 35 was marked for identification 16:48:10
2 and is attached hereto.)

3 BY MR. FERRALL:

4 Q We've marked as Exhibit 35 a set of emails
5 bearing control numbers CSI-CLI-01134849 to 850. 14:03:19

6 This appears to be some email exchange
7 between you and Joe Hielscher.

8 Did I say that right?

9 A I have no idea if you said it correctly.

10 Q Do you know who he is? 14:03:47

11 A I think he's a communications person
12 working at Cisco.

13 Q Okay. My question here is just about your
14 email at the top of the first page. You explain in
15 the first sentence that Releases 8, 9 and 10 can be 14:04:22
16 found on a volume if you have a UNIX account. And
17 then you write, "Releases 5, 6 and 7 are likely
18 lost, since I believe their archives were deleted by
19 someone."

20 Do you -- do you have a recollection about 14:04:43
21 whether releases of IOS are -- were lost at some
22 point?

23 A Yes.

24 Q Were they? Were certain releases lost?

25 A Yes. The source code to a number of early 14:05:11

Page 109		Page 111	
1	reveal -- basically mostly status commands and ones 14:27:53	1	bracket prompt? 14:33:02
2	for handling connections over the network to other	2	A Router name, close angle bracket.
3	hosts, sort of a subset of the -- of the terminal	3	Q Right.
4	server commands.	4	A Yes, I chose that.
5	Q And you said you chose the term "EXEC," 14:28:26	5	Q Okay. How did you come to choose that? 14:33:09
6	that's E-X-E-C; is that right?	6	A Well, there were -- when you have multiple
7	A Yes.	7	devices on a network, one of the first things you
8	Q You chose that term, yes?	8	want to know if you're typing at something is to
9	A Yes.	9	what you are typing at. So that -- sort of the most
10	Q How did you come up with that term? 14:28:39	10	aesthetic choice was the -- was the name of the 14:33:51
11	A Well, I had a number of possible ways of	11	device.
12	describing it. I could have used "shell" after	12	And the angle bracket was a nice visual
13	the -- modeling it along the UNIX way of -- UNIX	13	way of terminating -- you know, here's where your
14	equivalent.	14	type-in begins. Here's where the prompt ends,
15	From -- I decided EXEC in sort of -- you 14:29:15	15	here's where the type-in begins. 14:34:19
16	know, inspired by the TOPS-20 command processor.	16	Q Had you ever seen the angle bracket used
17	You know, calling it the command processor would	17	as a prompt in any other system?
18	have been another possibility.	18	A I wasn't aware of any generally available
19	There was a number of possibilities that I	19	host -- general purpose timesharing that actually
20	could have called it, what I could have called that 14:29:38	20	that was the default, that was the prompt. 14:34:56
21	particular part of the software, and I ended up	21	Q I'm not sure what you mean by that.
22	choosing EXEC.	22	But had you ever seen any system that used
23	Q Now, were you responsible for determining	23	a close angle bracket as a prompt?
24	the prompt symbol on the interface?	24	A No. TOPS-20 used an "at" sign and UNIX
25	I'm sorry. Let me be clear. 14:30:26	25	used a percent sign. 14:35:19
Page 110		Page 112	
1	I'm talking about on the interface line, 14:30:28	1	Q And you're not aware of any use of a hash 14:35:22
2	there are symbols that precede the input point, such	2	sign as a prompt?
3	as a hash sign, for example, right?	3	A Not to my recollection.
4	A So for -- I was responsible for choosing	4	Q You were familiar with UNIX in the mid
5	the prompts for the command line interface, for the 14:30:45	5	1980s, right? 14:36:18
6	CLI.	6	A As a user of UNIX.
7	Q Okay. And tell me what those prompts are,	7	Q And -- by the way, are you familiar with
8	the various prompts that the Cisco CLI uses.	8	Linux?
9	A There are many right now. But at the time	9	A Only as a user.
10	there was the -- the unprivileged EXEC commands, and 14:31:09	10	Q When did you first become familiar with 14:36:38
11	that was the host name of the -- of the router or --	11	Linux?
12	of the router, followed by a close angle bracket.	12	A With Linux? I think I first heard mention
13	There was a privileged mode, and it	13	of it in the late '90s.
14	changed that prompt to a hash mark.	14	Q Did Cisco come up with the nomenclature of
15	And in the initial implementation of 14:31:55	15	calling a mode "privileged," to your knowledge? 14:38:02
16	configuration mode, there was no prompt.	16	A I don't believe -- I don't believe Cisco
17	Q Okay. How did you choose the hash prompt	17	came up with that terminology.
18	for the privileged mode?	18	Q Let me turn to the current set of IOS CLI
19	A It was visually large and different than	19	commands.
20	the -- different -- just different than the 14:32:25	20	I don't expect an exact number, but do you 14:38:54
21	unprivileged EXEC prompt.	21	know approximately how many IOS CLI commands there
22	Q Okay. How did you use the unprivileged	22	are today?
23	close angle bracket prompt?	23	A I would have to guess. It is a -- it's a
24	A I don't understand your question.	24	very large number.
25	Q Did you choose to use the close angle 14:32:59	25	Q Can you just give me a ballpark? 14:39:15

Page 121

1 THE VIDEO OPERATOR: Going off the record, 14:58:06
 2 the time is 2:58 p.m.
 3 (Recess, 2:58 p.m. - 3:24 p.m.)
 4 THE VIDEO OPERATOR: Back on the record.
 5 The time is 3:24 p.m. 15:24:02
 6 BY MR. FERRALL:
 7 Q Mr. Lougheed, when did you first become
 8 aware of DOS, D-O-S?
 9 A I'd say whose DOS?
 10 Q MS-DOS. 15:24:36
 11 A MS-DOS? I probably heard about it when
 12 IBM announced the IBM PC.
 13 Q Do you recall that MS-DOS uses a close
 14 angle bracket as a prompt?
 15 A Now that you remind me, it does. 15:25:16
 16 Q Do you think you might have been inspired
 17 by that prompt when you chose the close angle
 18 bracket for Cisco's prompt?
 19 A No. I was not a DOS user.
 20 Q So it's just a coincidence that you and 15:25:34
 21 DOS came up with the same prompt, to your knowledge?
 22 MR. NEUKOM: Objection. Asked and
 23 answered.
 24 THE WITNESS: I was not a DOS user. I
 25 first -- I was not a DOS user. 15:26:06

Page 122

1 MR. FERRALL: Let's mark this as the next 15:26:35
 2 exhibit.
 3 (Exhibit 38 was marked for identification
 4 and is attached hereto.)
 5 BY MR. FERRALL: 15:26:37
 6 Q Exhibit 38 is a set of emails between you
 7 and Mr. Remaker, among others. It bears control
 8 numbers CSI-ANI-00043306.
 9 A Okay. I'd like to read this.
 10 Q First let me ask you the question so you 15:27:19
 11 know what to look for.
 12 A I will forget the question by the time I'm
 13 done reading this.
 14 Q Well, Mr. Lougheed, that's not the way it
 15 works, actually. I ask the question and you answer 15:27:28
 16 it.
 17 A Okay.
 18 Q If you can't answer it, then you tell me.
 19 My only question is, did you send the
 20 email that's at the top of Exhibit 38, the one at 15:27:38
 21 12-11-2008 at 10:14 p m.?
 22 MR. NEUKOM: Mischaracterizes the document
 23 on its face.
 24 And I know that Mr. Ferrall would like you
 25 to feel comfortable to read the page-and-a-half 15:27:54

Page 123

1 document that he's just put in front of you before 15:27:57
 2 answering his question.
 3 THE WITNESS: Okay. I'll read it.
 4 MR. FERRALL: Actually, no, I would like
 5 him to answer the question. 15:28:03
 6 Q Are you telling me you can't tell me
 7 whether you sent the email?
 8 MR. NEUKOM: It's a totally unfair
 9 question. The email that he sent would necessarily
 10 include everything that follows. 15:28:10
 11 If you want him to tell you whether he
 12 remembers this or whether he sent it, let him read
 13 the document. Come on, Brian.
 14 It's a page and a half. We're not talking
 15 about him wasting 30 minutes to read a product 15:28:20
 16 manual. It's a page-and-a-half email. The witness
 17 has said he wants to read it, and we're going to let
 18 him read it.
 19 THE WITNESS: Okay. I've read it.
 20 BY MR. FERRALL: 15:29:28
 21 Q Okay. Did you send this email that's
 22 dated December 11, 2008, at 10:14 p m.?
 23 A I believe I did.
 24 Q Okay. And in the last paragraph of that
 25 email, you write, "The percent sign leading a 15:29:41

Page 124

1 message indicates that you are looking at an error 15:29:49
 2 message. An ancient operating system called TOPS-20
 3 used such a convention and I adopted it."
 4 Do you see that?
 5 A Yeah, I do see that. 15:29:59
 6 Q Why did you adopt a TOPS-20 convention?
 7 A Of the possibilities that I had, that
 8 seemed -- that seemed a reasonable -- to me, it
 9 seemed like a reasonable way of doing things.
 10 Q Did you get permission from Digital 15:30:32
 11 Equipment Company to use that convention?
 12 MR. NEUKOM: Objection. Calls for a legal
 13 conclusion and misstates prior testimony.
 14 THE WITNESS: No, I did not seek
 15 permission. 15:30:55
 16 BY MR. FERRALL:
 17 Q Have you ever heard of the acronym RIP in
 18 the context of networking?
 19 A It typically means routing information
 20 protocol. 15:31:18
 21 Q You're familiar with that protocol?
 22 A It's been a while, but yes, I'm familiar
 23 with it.
 24 Q Did you make up the acronym RIP for
 25 routing information protocol? 15:31:32

Page 125			Page 127		
1	A No, I did not make up that acronym.	15:31:37	1	A He worked for IBM.	15:34:52
2	Q Did you make up the term "routing		2	Q What was Mr. Rekhter's contribution to the	
3	information protocol"?		3	BGP RFC? The first one?	
4	A No.		4	A We were co-designers.	
5	Q Did you submit an RFC for the routing	15:31:51	5	Q Are you able to describe what he	15:35:28
6	information protocol?		6	contributed as opposed to what you contributed?	
7	A No.		7	A No. We worked closely together.	
8	Q Do you know who did?		8	Q Do you know whether you ever made any	
9	A No, I don't know who did.		9	declarations to the IETF concerning copyrights that	
10	Q Did you ever ask permission from the	15:32:25	10	Cisco claimed in any of the language in the first	15:35:57
11	person who made up the term "RIP" for permission to		11	BGP RFC?	
12	use it, to use that term?		12	MR. NEUKOM: Objection. Vague, compound.	
13	MR. NEUKOM: Objection. Foundation,		13	THE WITNESS: To the best of my	
14	vague, and calls for a legal conclusion.		14	recollection, we made no copyright claims in the	
15	THE WITNESS: There was no one whose	15:32:50	15	first BGP RFC.	15:36:17
16	permission one could ask.		16	BY MR. FERRALL:	
17	BY MR. FERRALL:		17	Q Did Cisco make any disclosures to the IETF	
18	Q Well, I'll tell you, a Mr. Charles Hedrick		18	regarding copyright claims in any of the BGP RFCs?	
19	at Rutgers submitted what I believe to be the first		19	MR. NEUKOM: Objection. Compound, vague.	
20	RFC on the routing information protocol.	15:33:05	20	THE WITNESS: Not to my knowledge.	15:36:35
21	Do you know Mr. Hedrick?		21	BY MR. FERRALL:	
22	A I do.		22	Q Did you ever make a disclosure to the	
23	Q Did you ever ask him for permission to use		23	Internet Architecture Board of any intellectual	
24	the term "RIP"?		24	property rights in BGP, to your knowledge?	
25	MR. NEUKOM: Objection. Asked and	15:33:15	25	A To my knowledge --	15:36:57
Page 126			Page 128		
1	answered.	15:33:15	1	MR. NEUKOM: Objection. Compound, vague.	15:37:00
2	THE WITNESS: Mr. Hedrick formally		2	THE WITNESS: -- we did not make any such	
3	documented an informal standard that was already in		3	assertions.	
4	use in the industry for a number of years.		4	MR. NEUKOM: And foundation.	
5	BY MR. FERRALL:	15:33:27	5	BY MR. FERRALL:	15:37:08
6	Q And what's the significance of that?		6	Q Did you ever have an agreement with	
7	MR. NEUKOM: Objection. Calls for		7	Mr. Rekhter about the right to use any of his	
8	speculation.		8	contributions to the BGP work that you guys did?	
9	THE WITNESS: It wouldn't have occurred to		9	MR. NEUKOM: Vague, compound, calls for a	
10	me to ask him for permission.	15:33:47	10	legal conclusion --	15:37:44
11	BY MR. FERRALL:		11	THE WITNESS: Could you --	
12	Q I think you testified earlier that you		12	MR. NEUKOM: -- and mischaracterizes prior	
13	submitted several RFCs for the border gateway		13	testimony.	
14	protocol, correct?		14	THE WITNESS: Could you repeat the	
15	A Correct.	15:34:07	15	question, please?	15:37:59
16	Q And your co-author on at least the first		16	BY MR. FERRALL:	
17	such RFC was a Mr. Yakov Rekhter, correct?		17	Q Sure. I'll ask a slightly different	
18	A Correct.		18	question.	
19	Q Was he your co-author on the subsequent		19	Did you ever ask permission from	
20	submissions, too, do you know?	15:34:31	20	Mr. Rekhter to use any of his contributions to the	15:38:09
21	A Certainly on the second one. I don't		21	BGP project?	
22	recall on the third one. And after that, there were		22	MR. NEUKOM: Objection. Vague, compound,	
23	other co-authors.		23	calls for a legal conclusion.	
24	Q And where does Mr. Rekhter or did		24	THE WITNESS: We did not seek permission	
25	Mr. Rekhter work at the time?	15:34:50	25	from one another for our individual contributions.	15:38:26

Page 129	Page 131
<p>1 BY MR. FERRALL: 15:38:30</p> <p>2 Q Okay. IBM didn't ask you for permission,</p> <p>3 either, correct?</p> <p>4 A No.</p> <p>5 Q One of the CLI terms in this case is the 15:39:20</p> <p>6 term "IP address."</p> <p>7 Are you familiar with that?</p> <p>8 A I'm familiar with the command expression</p> <p>9 "IP address."</p> <p>10 Q Did you come up with the phrase "IP 15:39:33</p> <p>11 address"?</p> <p>12 A When Cisco came out of Stanford, we were</p> <p>13 shipping an IP -- an Internet protocol only router.</p> <p>14 And there was a command "address" that took some</p> <p>15 arguments. 15:40:12</p> <p>16 And after -- after a while, we started</p> <p>17 adding other protocols to the software. The first</p> <p>18 one was "DECnet." And since "address" was already</p> <p>19 taken to refer to IP functionality, Internet</p> <p>20 protocol functionality, we came up with "DECnet 15:40:44</p> <p>21 address," and then had a DECnet address after it.</p> <p>22 That "DECnet address" command could have</p> <p>23 very well have said "address," and then DECnet</p> <p>24 addresses look different than IP addresses, and we</p> <p>25 could have had the software figure out which type of 15:41:11</p>	<p>1 MR. NEUKOM: Objection. Vague and asked 15:42:59</p> <p>2 and answered.</p> <p>3 THE WITNESS: I suppose I had. When one</p> <p>4 is talking about different networking protocols, one</p> <p>5 needs to clarify which networking protocol one is 15:43:10</p> <p>6 talking about. So it was probably terminology that</p> <p>7 was in the air.</p> <p>8 BY MR. FERRALL:</p> <p>9 Q Does the same go for "IP host," also? You</p> <p>10 had heard that before you joined Cisco? 15:43:29</p> <p>11 MR. NEUKOM: Objection. Misstates prior</p> <p>12 testimony.</p> <p>13 THE WITNESS: The original form of the</p> <p>14 "host" command was just "host command." It was</p> <p>15 another one that had to distinguish, in a 15:43:41</p> <p>16 multi-protocol world, in a multi-protocol piece of</p> <p>17 software, what you were talking about.</p> <p>18 It would have looked very odd in a</p> <p>19 multi-protocol router that there was one protocol</p> <p>20 that wasn't prefaced by a -- some descriptive 15:44:03</p> <p>21 keyword.</p> <p>22 BY MR. FERRALL:</p> <p>23 Q Following up on that, the purpose of your</p> <p>24 use of "IP" as the first keyword in that command "IP</p> <p>25 host" was to distinguish the protocol that it's 15:44:33</p>
Page 130	Page 132
<p>1 address we were referring to. But we chose "DECnet 15:41:13</p> <p>2 address."</p> <p>3 It became clear that much more -- that we</p> <p>4 were becoming a multi-protocol router. We were</p> <p>5 adding other protocols into the box, into the 15:41:27</p> <p>6 software.</p> <p>7 And I had -- I value -- I value the</p> <p>8 aesthetic of having a symmetric-looking command line</p> <p>9 expression, symmetric hierarchy. It was clear we</p> <p>10 were heading towards a hierarchy. 15:41:52</p> <p>11 So at some point after DECnet and perhaps</p> <p>12 a few other protocols to make things look very</p> <p>13 similar, we started prefacing our IP-only commands</p> <p>14 with "IP." And that gave a very -- what I thought</p> <p>15 was a very elegant, symmetric, elegant way of 15:42:16</p> <p>16 referring to different protocols within a</p> <p>17 multi-protocol router.</p> <p>18 So that is the history of the "IP address"</p> <p>19 command.</p> <p>20 Q Okay. My question was simpler. I 15:42:36</p> <p>21 appreciate that answer. But my question was a</p> <p>22 little simpler than that, but let me ask it a</p> <p>23 different way.</p> <p>24 You had heard of the term "IP address"</p> <p>25 before you joined Cisco, hadn't you? 15:42:51</p>	<p>1 referring to? 15:44:36</p> <p>2 A That was the aesthetic choice I made.</p> <p>3 MR. NEUKOM: Objection. Mischaracterizes</p> <p>4 prior testimony.</p> <p>5 THE WITNESS: There were many possible 15:44:49</p> <p>6 ways of doing it. As I indicated, I could perhaps</p> <p>7 take a look at an address and then infer what it</p> <p>8 was. But that was not the choice that I made at the</p> <p>9 time.</p> <p>10 BY MR. FERRALL: 15:45:07</p> <p>11 Q What were the alternative commands that</p> <p>12 you considered for "IP host"?</p> <p>13 A "Name." "Name" was certainly one of the</p> <p>14 possible candidates. "Network system" or</p> <p>15 "system" -- there are many, many words that one 15:45:51</p> <p>16 could use to refer to all sorts of different things.</p> <p>17 Q Okay. But now you're talking about</p> <p>18 alternatives for the word "host," right?</p> <p>19 A Um-hum.</p> <p>20 Q Okay. You didn't -- you're not the first 15:46:08</p> <p>21 one to use the word "host," are you?</p> <p>22 A No.</p> <p>23 Q I mean, "host" had been used for -- well</p> <p>24 before you joined Cisco to refer to a computer host.</p> <p>25 It's a conventional term, right? 15:46:29</p>

Page 141	Page 143
<p>1 BY MR. FERRALL: 16:08:17</p> <p>2 Q Okay. Do you have any other recollection</p> <p>3 as to who actually received the software from</p> <p>4 Mr. Hedrick?</p> <p>5 A No. 16:08:22</p> <p>6 Q Tell me how -- strike that.</p> <p>7 Do you believe that you created the</p> <p>8 command "IP access list"?</p> <p>9 MR. NEUKOM: Objection. Vague.</p> <p>10 THE WITNESS: I -- yes. 16:10:20</p> <p>11 BY MR. FERRALL:</p> <p>12 Q What functionality does that implement?</p> <p>13 A It -- the "access list" command, which I</p> <p>14 implemented at Stanford, the original form at</p> <p>15 Stanford was a sequence of addresses and subnet 16:10:51</p> <p>16 masks or -- in a mask, not a subnet mask but a mask,</p> <p>17 saying which bits to ignore in the address.</p> <p>18 And you provide a list of these items and</p> <p>19 give it a number. I chose -- I chose 1, 2, 3, 4, up</p> <p>20 to 99, or something like that. 16:11:35</p> <p>21 And then if you assigned it to a terminal</p> <p>22 line, it could restrict what computers -- what</p> <p>23 addresses somebody could connect to from that</p> <p>24 particular terminal line.</p> <p>25 You could also assign it to a network 16:11:59</p>	<p>1 A I don't remember the exact details, but it 16:13:52</p> <p>2 is -- either assigns an access list to an interface</p> <p>3 or -- I think it assigns an interface to a -- an</p> <p>4 access list to an interface. I believe it's access</p> <p>5 class or something like that that assigns it to an 16:14:07</p> <p>6 interface or to a line number.</p> <p>7 Q The term "domain name" is not a term that</p> <p>8 you made up, is it?</p> <p>9 A No, I didn't make -- I -- no, I did not.</p> <p>10 Q "Domain name" is a term that goes back to 16:15:38</p> <p>11 the ARPANET, actually. Are you aware of that?</p> <p>12 MR. NEUKOM: Objection. Foundation.</p> <p>13 THE WITNESS: I would be unsurprised if it</p> <p>14 went back that far.</p> <p>15 Are you referring to ARPANET protocols or 16:16:02</p> <p>16 ARPANET network?</p> <p>17 BY MR. FERRALL:</p> <p>18 Q The ARPANET network.</p> <p>19 A I believe the concept was introduced while</p> <p>20 the ARPANET network was still running. 16:16:15</p> <p>21 Q What about the words "domain lookup"? Did</p> <p>22 you coin that term "domain lookup"?</p> <p>23 MR. NEUKOM: Objection. Vague.</p> <p>24 THE WITNESS: It's a parallel construction</p> <p>25 to terms like "address lookup" or "host lookup" or 16:16:52</p>
Page 142	Page 144
<p>1 interface, and it would -- as a packet that was 16:12:12</p> <p>2 being sent -- sent out that interface, it could</p> <p>3 either be permitted or denied going through that</p> <p>4 interface.</p> <p>5 Those were the two original uses of the 16:12:29</p> <p>6 "access list" command expression.</p> <p>7 Q Do you believe that you coined the term</p> <p>8 "access list"?</p> <p>9 A It was my choice to use that description.</p> <p>10 Q Well, I'm asking you if you coined that 16:12:56</p> <p>11 term, or had you ever heard that term before in the</p> <p>12 context of networking?</p> <p>13 MR. NEUKOM: Objection. Vague, compound,</p> <p>14 asked and answered.</p> <p>15 THE WITNESS: I do not believe that I had 16:13:13</p> <p>16 heard the term before.</p> <p>17 BY MR. FERRALL:</p> <p>18 Q Had you heard the term "IP access group"</p> <p>19 before?</p> <p>20 A Yes. 16:13:25</p> <p>21 Q Who coined that term, to your knowledge,</p> <p>22 do you know?</p> <p>23 A I did.</p> <p>24 Q Under what circumstances? Or for what</p> <p>25 purpose, I should say? 16:13:39</p>	<p>1 the like, or "database lookup" or... 16:16:59</p> <p>2 BY MR. FERRALL:</p> <p>3 Q Did you coin the term "domain lookup"?</p> <p>4 A I decided to use that as a command</p> <p>5 expression within the software, yes. 16:17:21</p> <p>6 Q I'll ask the question one more time. I'm</p> <p>7 asking you if you coined the term "domain lookup."</p> <p>8 MR. NEUKOM: Objection. Asked and</p> <p>9 answered and vague.</p> <p>10 THE WITNESS: I did not. 16:17:43</p> <p>11 BY MR. FERRALL:</p> <p>12 Q Do you know who did?</p> <p>13 A No idea.</p> <p>14 Q When was -- to your knowledge, when was</p> <p>15 the term "routing" ever used in conjunction with the 16:18:41</p> <p>16 Internet protocol?</p> <p>17 MR. NEUKOM: Objection. Vague and</p> <p>18 foundation.</p> <p>19 THE WITNESS: I don't know when the term</p> <p>20 "routing" was used. 16:19:05</p> <p>21 BY MR. FERRALL:</p> <p>22 Q Were people in the field talking about</p> <p>23 routing in connection with IP before you joined</p> <p>24 Cisco?</p> <p>25 MR. NEUKOM: Objection. Vague, compound. 16:19:24</p>

Page 149	Page 151
<p>1 allowing for implementing new functionality in a -- 16:29:49</p> <p>2 what you said -- in a logical, correct place?</p> <p>3 A That is the benefit.</p> <p>4 MR. NEUKOM: Objection. Asked and</p> <p>5 answered. 16:30:09</p> <p>6 BY MR. FERRALL:</p> <p>7 Q Are there any other benefits to the</p> <p>8 framework for the hierarchy?</p> <p>9 MR. NEUKOM: Objection. Vague.</p> <p>10 THE WITNESS: We believed that it would 16:30:29</p> <p>11 make it easier -- we believed that the customers</p> <p>12 would like it.</p> <p>13 BY MR. FERRALL:</p> <p>14 Q Why is that?</p> <p>15 A Customers always like products that look 16:30:52</p> <p>16 like they were built by one company.</p> <p>17 Q How would your hierarchy contribute to</p> <p>18 that?</p> <p>19 MR. NEUKOM: Objection. Foundation, calls</p> <p>20 for speculation and vague. 16:31:06</p> <p>21 THE WITNESS: I'm sorry. What was your</p> <p>22 question?</p> <p>23 BY MR. FERRALL:</p> <p>24 Q How does the framework for the hierarchy</p> <p>25 that you described allow customers to feel like the 16:31:22</p>	<p>1 BY MR. FERRALL: 16:34:00</p> <p>2 Q Are you aware of any other CLI command</p> <p>3 sets that are arranged hierarchically?</p> <p>4 A No, I'm not.</p> <p>5 Q Were you aware of any -- prior to your -- 16:34:16</p> <p>6 strike that.</p> <p>7 Prior to your joining Cisco, were you</p> <p>8 aware of any operating systems that used multi-word</p> <p>9 commands?</p> <p>10 MR. NEUKOM: Objection. Vague. 16:34:39</p> <p>11 THE WITNESS: I was not aware of any</p> <p>12 router or switch products that had such things.</p> <p>13 BY MR. FERRALL:</p> <p>14 Q Well, were you aware of any operating</p> <p>15 systems that used multi-word commands? 16:34:53</p> <p>16 MR. NEUKOM: Objection. Asked and</p> <p>17 answered.</p> <p>18 THE WITNESS: Yes.</p> <p>19 BY MR. FERRALL:</p> <p>20 Q What examples were you aware of? 16:35:04</p> <p>21 A Of operating systems that had multi-word</p> <p>22 commands? I was most familiar with UNIX and</p> <p>23 TOPS-20.</p> <p>24 Q Any others?</p> <p>25 A I had the vague impression that VMS had 16:35:27</p>
Page 150	Page 152
<p>1 product was built by one company, to use your words? 16:31:31</p> <p>2 A Well, that was the belief of the</p> <p>3 engineers.</p> <p>4 Q I'm asking you to explain why you believe</p> <p>5 that. 16:31:52</p> <p>6 A It's an opinion of mine. I have no -- did</p> <p>7 not have evidence for it at the time.</p> <p>8 Q What is the alternative or alternatives to</p> <p>9 the framework for the hierarchy you described?</p> <p>10 MR. NEUKOM: Objection. Vague and 16:32:33</p> <p>11 compound, calls for speculation.</p> <p>12 THE WITNESS: So I don't have experience</p> <p>13 with other vendors' interfaces for routers and</p> <p>14 networking devices. I have only had descriptions</p> <p>15 from others of styles of interfaces. 16:33:01</p> <p>16 We had a competitor named Wellfleet that</p> <p>17 attempted to introduce a user interface that, as it</p> <p>18 was described to me, was typing in ASN.1 notation as</p> <p>19 defined in the SNMP protocol for retrieving and</p> <p>20 setting information. 16:33:27</p> <p>21 An ASN.1 notation is numbers and --</p> <p>22 numbers and decimal points.</p> <p>23 My understanding is that it was not</p> <p>24 popular with customers. But it was a way of</p> <p>25 managing a system. 16:33:52</p>	<p>1 such things. 16:35:35</p> <p>2 Q Prior to your joining Cisco, were you</p> <p>3 aware of any operating systems that had two or more</p> <p>4 commands that began with the same first word?</p> <p>5 MR. NEUKOM: Objection. Vague. 16:36:02</p> <p>6 THE WITNESS: Two or more commands that</p> <p>7 began with the same word. I can't recall any.</p> <p>8 MR. FERRALL: Let's mark this as the next</p> <p>9 exhibit.</p> <p>10 (Exhibit 39 was marked for identification 16:48:10</p> <p>11 and is attached hereto.)</p> <p>12 BY MR. FERRALL:</p> <p>13 Q Exhibit 39 is a document entitled "Cisco's</p> <p>14 Response to Arista's Interrogatory No. 16 amended</p> <p>15 Exhibit D-1 (IOS Release 11.0)." 16:37:09</p> <p>16 And I assume, Mr. Loughheed, that you</p> <p>17 haven't seen the cover page, but tell me if you've</p> <p>18 seen any of the inside to Exhibit 39.</p> <p>19 A I've not seen the inside of this.</p> <p>20 Q You've never seen these images? 16:37:35</p> <p>21 A I don't recall having seen them before.</p> <p>22 Q Okay. So if you look at -- if you go a</p> <p>23 couple of pages in, let's just take an example of</p> <p>24 the "clear" command set --</p> <p>25 A I'd like to page through the rest of this 16:38:14</p>

<p style="text-align: right;">Page 157</p> <p>1 This is the leading part of a command. There's more 16:47:45 2 to it than this. 3 MR. NEUKOM: Brian, I think at this point 4 we're coming up on an hour and a half. Do you mind 5 if we take a short break? 16:48:05 6 MR. FERRALL: Well, let me just ask one 7 more question. 8 Q If you go back to the "clear" example on 9 page 5, am I right that your conception of a 10 hierarchy for this command would still be 16:48:38 11 implemented even if the "clear" keyword command were 12 changed to something else like "white"? Is that 13 right? 14 MR. NEUKOM: Objection. Vague, compound, 15 hypothetical, calls for opinion testimony. 16:49:04 16 THE WITNESS: Are you asking if I could 17 have chosen another word besides "clear"? 18 BY MR. FERRALL: 19 Q No. I'm asking if you're -- another way 20 of asking it is does the concept of your hierarchy 16:49:18 21 depend upon the selection of the first word, or is 22 it independent of that? 23 MR. NEUKOM: Objection. Vague, calls for 24 speculation and opinion testimony. 25 THE WITNESS: There is a limited set of 16:49:48</p>	<p style="text-align: right;">Page 159</p> <p>1 And we'll take a break after the witness 16:51:47 2 answers this question. 3 THE WITNESS: I've answered the question 4 to the best of my ability. 5 BY MR. FERRALL: 16:52:03 6 Q Well, I'm entitled to an answer to this 7 one, not a reference to some past answer. So listen 8 to the question. 9 Can you tell me, if I used a different 10 keyword instead of "clear" on page 5 of Exhibit 39, 16:52:14 11 would I still be using your concept of a hierarchy? 12 MR. NEUKOM: Same objections. 13 And we're about five questions beyond the 14 one question you asked for before a break. 15 THE WITNESS: There is -- there's the 16:52:46 16 abstract concept of a hierarchy, and I -- I 17 basically don't understand what you're getting at. 18 I've answered the question to the best of 19 my ability. 20 MR. FERRALL: Okay. All right. Let's go 16:53:22 21 off the record. 22 THE VIDEO OPERATOR: Going off the record, 23 the time is 4:53 p.m. 24 (Recess, 4:53 p.m. - 5:13 p.m.) 25 THE VIDEO OPERATOR: Back on the record. 17:07:48</p>
<p style="text-align: right;">Page 158</p> <p>1 what we could call perhaps top-level keywords, 16:49:49 2 and -- that refer to configurable entities in the 3 software, in the system, that are often analogous. 4 And when you have a situation like that, 5 developing a hierarchy is a way of managing complex 16:50:18 6 entities that have many similarities and a few 7 differences. 8 BY MR. FERRALL: 9 Q I'm sorry. I've got to ask the question 10 again. If you can't answer it, tell me you can't 16:50:46 11 answer it. But here's my question: 12 In this example on page 5 of Exhibit 39, 13 does your concept of the hierarchy depicted here 14 depend upon the choice of the first keyword? 15 MR. NEUKOM: Objection. Mischaracterizes 16:51:08 16 the document and the witness's prior testimony, 17 vague, and calls for speculation and asked and 18 answered. 19 THE WITNESS: I do not believe I can 20 improve on my answer at this point. 16:51:20 21 BY MR. FERRALL: 22 Q Okay. So you couldn't tell me -- if I 23 used a different first keyword, could you tell me 24 whether I'm using your hierarchy idea or not? 25 MR. NEUKOM: Same objections. 16:51:38</p>	<p style="text-align: right;">Page 160</p> <p>1 The time is 5:13 p.m. 17:13:27 2 (Exhibit 40 was marked for identification 3 and is attached hereto.) 4 BY MR. FERRALL: 5 Q Okay. We just marked as Exhibit 40 an 17:13:32 6 email bearing control numbers CSI-CLI-00746398. It 7 appears to be between you and a Craig Fox, among 8 others. 9 And I guess my only question for you, 10 Mr. Loughheed, is do you have any reason to believe 17:13:57 11 that you didn't send this email that's Exhibit 40? 12 A It looks like I sent it. I have not had a 13 chance to read it. 14 Q Are you on the Parser Police mailing list? 15 MR. NEUKOM: Objection. Vague. 17:14:36 16 THE WITNESS: At one point I was. 17 BY MR. FERRALL: 18 Q For what period of time were you on that 19 mailing list? 20 A I don't -- I don't remember a time period, 17:14:56 21 but it has been many years since I have been on that 22 mailing list. 23 Q Are you on the Fellows mailing list? 24 MR. NEUKOM: Objection. Vague. 25 THE WITNESS: I'm on -- I've been on 17:15:32</p>

Page 173	Page 175
<p>1 MR. FERRALL: Why don't we go off the 17:45:36</p> <p>2 record and get a time check.</p> <p>3 THE VIDEO OPERATOR: Going off the record,</p> <p>4 the time is 5:45 p m.</p> <p>5 (Recess, 5:45 p m. - 5:46 p.m.) 17:45:41</p> <p>6 THE VIDEO OPERATOR: Back on the record,</p> <p>7 the time is 5:46 p m.</p> <p>8 MR. NEUKOM: So back on the record. I</p> <p>9 think we're all in agreement and the videographer</p> <p>10 has confirmed that there are 26 minutes left. 17:46:06</p> <p>11 MR. FERRALL: Right.</p> <p>12 Q So you have a set of commands that begin</p> <p>13 with the keyword "clear," right?</p> <p>14 A Um-hum.</p> <p>15 MR. NEUKOM: I think he needs a "yes" or a 17:46:36</p> <p>16 "no."</p> <p>17 THE WITNESS: Yes, the Cisco command line</p> <p>18 interface has a hierarchy of command expressions</p> <p>19 that begin with the keyword "clear."</p> <p>20 BY MR. FERRALL: 17:46:55</p> <p>21 Q Were you aware of any operating system</p> <p>22 that used the word "clear" as a command before you</p> <p>23 joined Cisco?</p> <p>24 MR. NEUKOM: Objection. Vague.</p> <p>25 THE WITNESS: I believe there is a UNIX 17:47:21</p>	<p>1 A It seemed -- it seemed aesthetically 17:49:52</p> <p>2 pleasing to me. It was something that was</p> <p>3 descriptive of an action that I wanted to take that</p> <p>4 was a fairly generic action, a fairly common action.</p> <p>5 Q What does "banner MOTD" mean? 17:50:47</p> <p>6 A MOTD is message of the day.</p> <p>7 Q Did you make up that acronym?</p> <p>8 A No, I did not.</p> <p>9 Q Who did?</p> <p>10 A I don't know. 17:51:07</p> <p>11 Q Did you coin the term "banner" as an</p> <p>12 operating system command?</p> <p>13 MR. NEUKOM: Objection. Vague.</p> <p>14 THE WITNESS: I simply implemented the</p> <p>15 command. 17:51:37</p> <p>16 BY MR. FERRALL:</p> <p>17 Q Are you aware of operating systems in</p> <p>18 existence before you joined Cisco that used the</p> <p>19 command "banner"?</p> <p>20 A I don't recall any at this point. 17:51:52</p> <p>21 Q When did you come up with the command</p> <p>22 "banner MOTD"?</p> <p>23 A The command that came first was just</p> <p>24 "banner," and its function was to print a vacant</p> <p>25 terminal message on a terminal and to apply some 17:52:26</p>
Page 174	Page 176
<p>1 command "clear" that blanks a screen. I'm not aware 17:47:22</p> <p>2 of any operating system that uses "clear" in the</p> <p>3 sense that the Cisco CLI uses "clear."</p> <p>4 BY MR. FERRALL:</p> <p>5 Q Tell me about the creative process that 17:47:57</p> <p>6 went into your selection of the word "clear" as the</p> <p>7 first keyword in these commands.</p> <p>8 MR. NEUKOM: Objection. Vague and</p> <p>9 compound.</p> <p>10 THE WITNESS: I needed some way of 17:48:19</p> <p>11 resetting or clearing data structures in the box,</p> <p>12 something that's very useful in the debugging of --</p> <p>13 that sort of action is very useful in debugging</p> <p>14 software, correcting problems in a running system</p> <p>15 and the like. 17:48:53</p> <p>16 And "reset" or "clear" or "zero" or</p> <p>17 "restart" certainly could have been possibilities.</p> <p>18 It was a very generically simple example. It was</p> <p>19 another sort of generic activity of I wanted to</p> <p>20 clear or reset some data structures. And that 17:49:20</p> <p>21 one -- I don't recall, but I suspect that one seemed</p> <p>22 reasonable and came to mind.</p> <p>23 BY MR. FERRALL:</p> <p>24 Q Do you recall why you selected the word</p> <p>25 "clear"? 17:49:47</p>	<p>1 jitter in the positioning so that it wouldn't burn 17:52:31</p> <p>2 in those letters in the -- in one spot in the</p> <p>3 terminal.</p> <p>4 Then I think after we left Stanford --</p> <p>5 actually, I'm not clear when the MOTD was 17:52:55</p> <p>6 implemented. I suspect it was after I left</p> <p>7 Stanford, but I'm not -- my memory is not clear on</p> <p>8 that.</p> <p>9 Q So to be clear, you're not saying that you</p> <p>10 came up with the term "banner" as a command, are 17:53:15</p> <p>11 you?</p> <p>12 MR. NEUKOM: Objection. Misstates prior</p> <p>13 testimony, vague.</p> <p>14 THE WITNESS: I implemented certain</p> <p>15 functionality that I triggered with that 17:53:26</p> <p>16 configuration command.</p> <p>17 BY MR. FERRALL:</p> <p>18 Q I'm going to ask the question again.</p> <p>19 Are you saying that you came up with the</p> <p>20 term "banner" as a command? 17:53:38</p> <p>21 MR. NEUKOM: Same objections.</p> <p>22 THE WITNESS: That was a choice that I</p> <p>23 made.</p> <p>24 BY MR. FERRALL:</p> <p>25 Q You borrowed it from another operating 17:53:55</p>

Page 177

1 system, didn't you? 17:53:57
 2 MR. NEUKOM: Objection. Asked and
 3 answered.
 4 THE WITNESS: I have no memory of
 5 borrowing it. 17:54:05
 6 BY MR. FERRALL:
 7 Q Okay. Do you have a memory of the
 8 creative process whereby you decided on "banner" as
 9 a command?
 10 A I don't remember the details. 17:54:21
 11 (Exhibit 42 was marked for identification
 12 and is attached hereto.)
 13 BY MR. FERRALL:
 14 Q We've marked as Exhibit 42 another excerpt
 15 of code that we've reformatted. It bears control 17:54:43
 16 numbers CSI-CLI-01108326.
 17 MR. NEUKOM: Counsel, I take it this is a
 18 printout of a file or a document that was produced
 19 with an AEO designation.
 20 MR. FERRALL: Right. 17:55:02
 21 MR. NEUKOM: Okay. So we're going to mark
 22 the witness's copy and we'll ask that all copies in
 23 the room be marked by hand with the phrase "Highly
 24 Confidential - AEO."
 25 /// 17:55:10

Page 178

1 BY MR. FERRALL: 17:55:19
 2 Q Mr. Lougheed, this is a document that
 3 appears to be your work, according to the copyright
 4 notice on the front.
 5 Do you see that? 17:55:29
 6 A Yes, I see that.
 7 Q Okay. Do you know when -- do you
 8 recognize it?
 9 A Yes, I do.
 10 Q What is it? 17:55:36
 11 [REDACTED]
 12 [REDACTED]
 13 [REDACTED]
 14 Q And when did you compose what's
 15 Exhibit 42? 17:56:02
 16 A Is there a question?
 17 Q Yes. I asked when did you compose
 18 Exhibit 42?
 19 A Apparently June of 1985.
 20 Q And you were employed by Stanford at that 17:56:28
 21 time, right?
 22 A Correct.
 23 Q We had talked earlier about the ARP,
 24 address resolution protocol.
 25 Do you remember that? 17:56:57

Page 179

1 A Yes. 17:56:58
 2 Q Okay.
 3 A I remember you asked questions about that.
 4 Q Are you familiar with there being a
 5 provision for time-outs in the ARP protocol? 17:57:15
 6 MR. NEUKOM: Objection. Vague and
 7 compound.
 8 THE WITNESS: There is the -- ARP entries
 9 can become stale. If you unplug the computer or you
 10 move the computer somewhere else or you replace the 17:57:43
 11 network interface, entries will become stale.
 12 Implementing a time-out is a way of making sure the
 13 cache isn't stale.
 14 BY MR. FERRALL:
 15 Q Are you aware of there being a provision 17:58:10
 16 for time-outs in the RFC for ARP?
 17 MR. NEUKOM: Objection. Vague and
 18 compound, asked and answered.
 19 THE WITNESS: I'm not -- I don't remember
 20 such language right now. 17:58:38
 21 BY MR. FERRALL:
 22 Q Did you create the term "distance BGP"?
 23 A Yes.
 24 Q How did you come up with that term?
 25 A The Cisco IOS started supporting multiple 17:59:11

Page 180

1 interior routing protocols. And customer networks, 17:59:19
 2 especially in the early days when they were attached
 3 to the -- they had campus networks running one
 4 routing protocol, they'd be attached to the NSFNET
 5 backbone as well running a different routing 17:59:39
 6 protocol.
 7 And since routing protocols would give
 8 incommensurate metrics, metrics that could not be
 9 compared, I developed a concept of distance that
 10 says if one routing protocol says it knows a route 18:00:08
 11 to one destination and another routing protocol says
 12 it knows a route to that same destination, which --
 13 the routing protocol with the smallest
 14 administrative distance would be the one that would
 15 be entered into the routing table. 18:00:24
 16 And so that was the problem, and my
 17 solution was the administrative distance mechanism
 18 that I described.
 19 And when I implemented BGP, that was a
 20 natural extension to include for BGP as well to be 18:00:49
 21 able to configure an administrative distance to
 22 determine the believability of BGP.
 23 If no routing protocol -- if only one
 24 routing protocol knew the destination, you would
 25 believe that. If there are two or more, 18:01:10

Page 181	Page 183
<p>1 administrative distance was the tie-breaker. 18:01:16</p> <p>2 Q Sorry. I'm going to jump back to ARP.</p> <p>3 There's a term you use associated with</p> <p>4 ARP, "ARP cache." We talked about that earlier in</p> <p>5 looking at one of the "clear" commands, right? 18:01:52</p> <p>6 Where did the term "ARP cache" come from?</p> <p>7 A The cache is a -- logically a list of</p> <p>8 items. An ARP cache would be a list of ARP requests</p> <p>9 that have been satisfied, including their MAC</p> <p>10 addresses and how long since the last time we'd seen 18:02:37</p> <p>11 a -- the router had seen an ARP request go by for</p> <p>12 that particular source address.</p> <p>13 That sort of computer science concept of a</p> <p>14 cache is found all over.</p> <p>15 Q One of the commands that is indicated that 18:03:14</p> <p>16 you authored is the command "boot system."</p> <p>17 Had you ever heard someone use the words</p> <p>18 "boot system" together before you joined Cisco?</p> <p>19 MR. NEUKOM: Objection. Vague.</p> <p>20 THE WITNESS: I had heard phrases like 18:03:45</p> <p>21 "boot the system up," "reboot the system," "reload</p> <p>22 the system," "start the system," "restart the</p> <p>23 system."</p> <p>24 (Exhibit 43 was marked for identification</p> <p>25 and is attached hereto.) 16:48:10</p>	<p>1 A When Cisco announced the -- actually, it 18:06:22</p> <p>2 was in the Mercury News in the morning, and then</p> <p>3 later through internal email at Cisco.</p> <p>4 Q When the suit was filed?</p> <p>5 A When the suit was filed. 18:06:38</p> <p>6 Q Okay. Not before?</p> <p>7 A Not before.</p> <p>8 Q Did you have any involvement in the</p> <p>9 litigation between Cisco and Huawei?</p> <p>10 MR. NEUKOM: That's a "yes" or "no" due to 18:06:49</p> <p>11 privilege concerns.</p> <p>12 THE WITNESS: No, I was not involved with</p> <p>13 Huawei.</p> <p>14 BY MR. FERRALL:</p> <p>15 Q Are you able to -- sorry. Strike that. 18:07:26</p> <p>16 Were you involved at all in composing any</p> <p>17 of the commands that begin with "AAA"?</p> <p>18 A No.</p> <p>19 Q Can you tell me how the "clock set"</p> <p>20 command was composed? 18:08:07</p> <p>21 A No, I cannot. I wasn't involved.</p> <p>22 Q Can you tell me how any of the IPv6</p> <p>23 commands were composed?</p> <p>24 A Yes.</p> <p>25 Q Which ones? 18:08:30</p>
Page 182	Page 184
<p>1 BY MR. FERRALL: 18:04:06</p> <p>2 Q We've marked as Exhibit 43 a document</p> <p>3 entitled "DECbrouter 90 Products Configuration and</p> <p>4 Reference Volume 2." It bears control numbers</p> <p>5 CSI-ANI-00081683 to 81683.000344. 18:04:25</p> <p>6 Have you ever seen Exhibit 43 before?</p> <p>7 A No.</p> <p>8 Q According to the metadata of this</p> <p>9 document, you are the custodian.</p> <p>10 Do you have any idea why that's the case? 18:05:03</p> <p>11 A No, I don't. I haven't seen it before.</p> <p>12 Q Let me turn to another question.</p> <p>13 Were you -- have you ever tracked the</p> <p>14 extent to which other companies have used Cisco CLI</p> <p>15 commands? 18:05:45</p> <p>16 A No, I have not.</p> <p>17 Q Are you aware of other companies using</p> <p>18 Cisco CLI commands?</p> <p>19 A I'm aware of Arista using Cisco CLI</p> <p>20 commands. 18:06:07</p> <p>21 Q Are you aware of any other company using</p> <p>22 Cisco CLI commands?</p> <p>23 A No, I'm not.</p> <p>24 Q When did you first become aware of Arista</p> <p>25 using Cisco CLI commands? 18:06:16</p>	<p>1 A IPv6 address. IPv6 route. 18:08:37</p> <p>2 Q What was your role in composing IPv6</p> <p>3 address?</p> <p>4 A I was creating a prototype IPv6</p> <p>5 implementation. 18:09:03</p> <p>6 Q Did you come up with that command, "IPv6</p> <p>7 address"?</p> <p>8 A Yes.</p> <p>9 Q When did you do that?</p> <p>10 A I believe it was 1996. 18:09:21</p> <p>11 Q Did you work with anyone else on that?</p> <p>12 A Yes.</p> <p>13 Q Who?</p> <p>14 A Dino Farinacci and Rand Atkinson, and</p> <p>15 later Pedro Marquez. 18:09:42</p> <p>16 Q The other one you said was IPv6 route?</p> <p>17 A That may have been Dino.</p> <p>18 MR. FERRALL: Let me go off the record for</p> <p>19 a second.</p> <p>20 THE VIDEO OPERATOR: Going off the record, 18:10:11</p> <p>21 the time is 6:10 p.m.</p> <p>22 (Recess, 6:10 p.m. - 6:11 p.m.)</p> <p>23 THE VIDEO OPERATOR: Back on the record.</p> <p>24 The time is 6:11 p.m.</p> <p>25 /// 18:11:34</p>

Page 185	Page 187
<p>1 BY MR. FERRALL: 18:11:36</p> <p>2 Q Did you compose the command "timers basic</p> <p>3 RIP"?</p> <p>4 A I believe I did.</p> <p>5 Q Prior to your joining Cisco, are you 18:11:55</p> <p>6 familiar with any commands that use the word</p> <p>7 "timers"?</p> <p>8 MR. NEUKOM: Objection. Vague.</p> <p>9 THE WITNESS: No, I was not aware of any</p> <p>10 operating system, general purpose or network 18:12:13</p> <p>11 specific, that used -- had a "timers" command.</p> <p>12 BY MR. FERRALL:</p> <p>13 Q How did you come up with the command</p> <p>14 "timers basic RIP"? Describe that creative process</p> <p>15 for me. 18:12:30</p> <p>16 A There developed a need or a desire to</p> <p>17 change some of the fundamental timing constants</p> <p>18 of -- I think first was the IGRP routing protocol,</p> <p>19 and I implemented a command that allowed those</p> <p>20 timers to be user-configured. 18:12:59</p> <p>21 And later on I or someone else extended</p> <p>22 that to the RIP timers so customers could speed up</p> <p>23 or slow down the pulse of routing updates.</p> <p>24 Q And when did that occur?</p> <p>25 A 1988 or 1989. 18:13:36</p>	<p>1 Mr. Tjong. If you're okay with it, I'd like to just 18:14:53</p> <p>2 do a stipulation across the case that both sides</p> <p>3 have the 30-day review and errata right for all</p> <p>4 transcripts regardless whether counsel puts it on</p> <p>5 the record at the depo as a two-way street. 18:15:04</p> <p>6 MR. FERRALL: That's fine. I thought it</p> <p>7 existed as a matter of procedure anyway. So that's</p> <p>8 fine.</p> <p>9 MR. NEUKOM: I hope you're right, but glad</p> <p>10 to have the stipulation, even if it's unnecessary. 18:15:17</p> <p>11 MR. FERRALL: Okay.</p> <p>12 MR. NEUKOM: Thanks very much.</p> <p>13 THE VIDEO OPERATOR: This concludes</p> <p>14 today's videotaped deposition of Mr. Kirk Lougheed.</p> <p>15 We're off the record at 6:15 p m. Thank you. 18:15:25</p> <p>16 (TIME NOTED: 6:15 p m.)</p> <p>17 --o0o--</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
Page 186	Page 188
<p>1 Q How did you choose the term -- the words 18:13:39</p> <p>2 "timers basic" for this function?</p> <p>3 A I don't remember where "basic" came from.</p> <p>4 But using the keyword "timers" was my -- was my</p> <p>5 introduction, was my creation. 18:14:00</p> <p>6 MR. NEUKOM: Counsel, I believe we're now</p> <p>7 beyond seven hours.</p> <p>8 MR. FERRALL: Okay. Well, I -- given</p> <p>9 Mr. Lougheed's tenure at Cisco, I thank him for his</p> <p>10 time, but I will say I think we deserve some more 18:14:22</p> <p>11 time with him.</p> <p>12 But I understand seven hours is up and</p> <p>13 you're going to say enough is enough for today I</p> <p>14 take it; is that right?</p> <p>15 MR. NEUKOM: Certainly for today for the 18:14:31</p> <p>16 sake of the witness. And we will respectfully</p> <p>17 disagree with the idea that counsel needs more than</p> <p>18 seven hours --</p> <p>19 MR. FERRALL: Okay.</p> <p>20 MR. NEUKOM: -- needs more than today. 18:14:41</p> <p>21 But we can discuss that for another day.</p> <p>22 In the meantime, I should note for the</p> <p>23 record the witness reserves the right to review the</p> <p>24 transcript and make corrections.</p> <p>25 Brian, I'm not sure I did that for 18:14:51</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8 I, KIRK LOUGHEED, do hereby declare under</p> <p>9 penalty of perjury that I have read the foregoing</p> <p>10 transcript; that I have made any corrections as</p> <p>11 appear noted, in ink, initialed by me, or attached</p> <p>12 hereto; that my testimony as contained herein, as</p> <p>13 corrected, is true and correct.</p> <p>14 EXECUTED this _____ day of _____,</p> <p>15 2015, at _____, _____.</p> <p>16 (City) (State)</p> <p>17</p> <p>18</p> <p>19</p> <p>20 KIRK LOUGHEED</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

1 I, the undersigned, a Certified Shorthand
2 Reporter of the State of California, do hereby
3 certify:

4 That the foregoing proceedings were taken
5 before me at the time and place herein set forth;
6 that any witnesses in the foregoing proceedings,
7 prior to testifying, were administered an oath; that
8 a record of the proceedings was made by me using
9 machine shorthand which was thereafter transcribed
10 under my direction; that the foregoing transcript is
11 a true record of the testimony given.

12 Further, that if the foregoing pertains to
13 the original transcript of a deposition in a Federal
14 Case, before completion of the proceedings, review
15 of the transcript [X] was [] was not requested.

16 I further certify I am neither financially
17 interested in the action nor a relative or employee
18 of any attorney or any party to this action.

19 IN WITNESS WHEREOF, I have this date
20 subscribed my name.

21
22 Dated: 11/25/2015

23
24 <%signature%>
25 CARLA SOARES